Phylum Chordata
Featuring Vertebrate Animals

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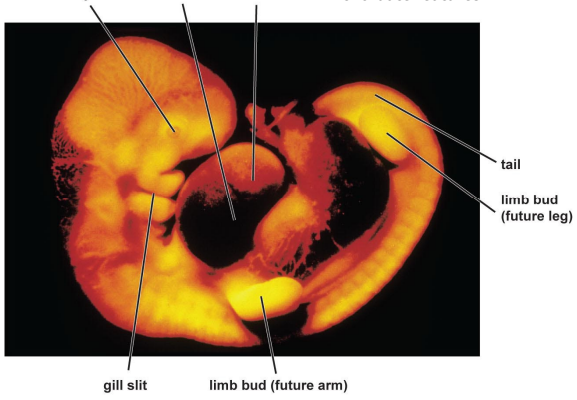
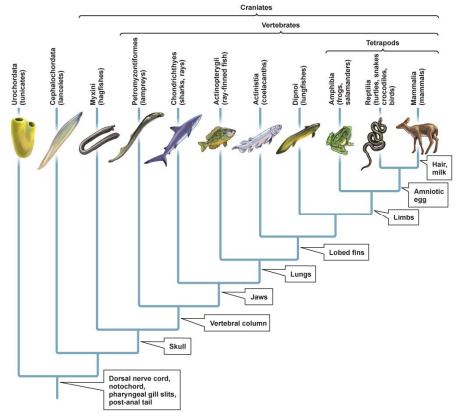
For Linn-Benton Community College

Characteristics

- All have a notochord: a stiff but flexible rod that extends the length of the body and serves as a point of attachment for the muscles.
- A dorsal, hollow nerve cord - connects to the brain at the anterior end.
- Pharyngeal gill slits which appear at some time in the development of chordates, may form functional respiratory organs in those animals with gills.
- Post-anal tail (at some point in development).
- All have deuterstome development.

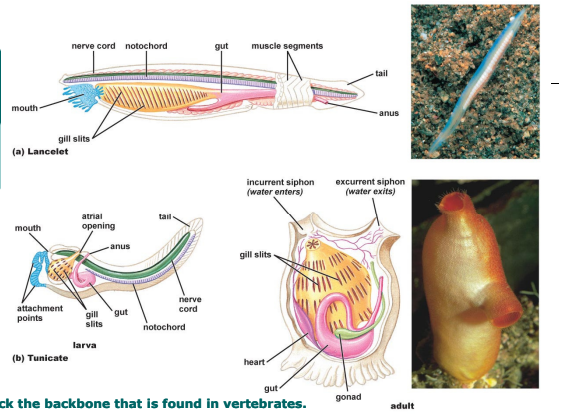
Human Embryo – features 4 chordate features.





Representative Members

I. Invertebrate Chordates
   Lancelets
   Tunicates
II. Vertebrate Chordates
   Fish
   Amphibians
   Reptiles
   Birds
   Mammals



Lack the backbone that is found in vertebrates.

Have a nerve cord and all other chordate features.

Jawless fish

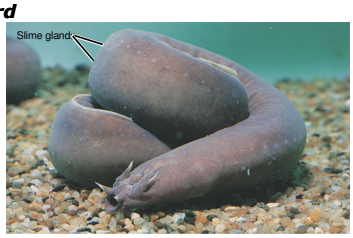
Hagfishes & Lamphreys

- The earliest vertebrate fossils.
- ***Do not have a bony backbone***, but rather a flexible nerve cord & some cartilage

Hagfishes – A jawless fish

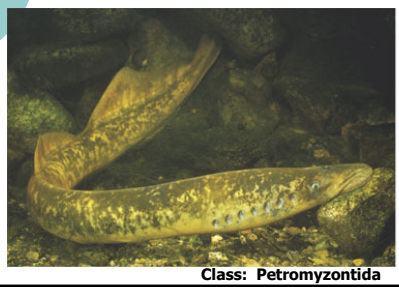
Least derived craniate lineage that still survives.
A slimy character
Lack Vertebrae & no jaws.
Deep water – Marine
Retain Notochord
as adults.

Class ***Myxini***



Lampreys are jawless vertebrates

Inhabiting various marine & freshwater habitats.
Have a spinal cord protected by segments of **cartilage** (tube & projects) - true vertebrate. Parasitic fish.



Class: Petromyzontida

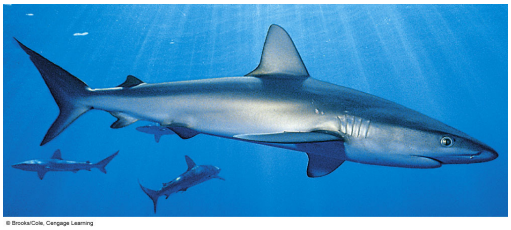
Fish with Jaws

Jaws allowed these animals to grasp food and become better hunters.

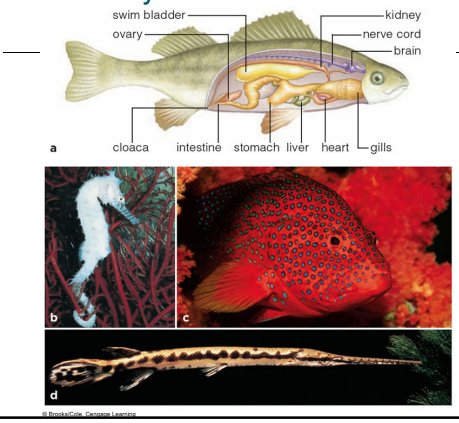
I. Chondrichthyes - Cartilage fishes include sharks, skates & rays.

II. Osteichthyes - Bony fishes (largest group of vertebrates by number of species).

Chondrichthyes



Osteichthyes



Some unusually adapted bony fish

(a) Anglerfish (b) Moray eel (c) Sea horse

Amphibians

-Animals that live part of their lives on land and part in the water.

- A three chambered heart.
- Must lay their eggs in the water, because they are not protected by shells.
- Have a thin, permeable skin, subject to water loss & dehydration, some species respire through the skin.
- Some representatives undergo a metamorphosis during development that includes a larval phase.

(a) Tadpole (b) Frog (c) Salamander (d) Caecilian

Reptiles

- Have a tough, scaly skin that resists water loss.
- Have internal fertilization of eggs.
- Have an amniotic (shelled) egg that encloses a watery environment during development.
- Have a three chambered heart.
- Dinosaurs which were the largest reptiles ruled for 150 million years.

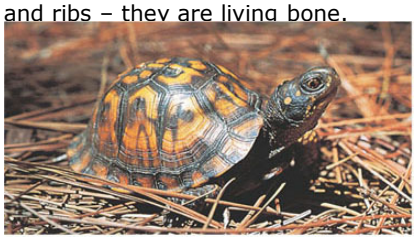
(a) Snake

(b) Alligator

(c) Tortoise

Special Adaptations - Protection

- All turtles have a boxlike shell
  - Made of upper and lower shields that are fused to the vertebrae, clavicles, and ribs – they are living bone.



(d) Eastern box turtle *(Terrapene carolina carolina)*

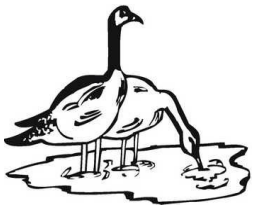
Birds

- Have feathers, which are highly modified and specialized scales for insulation and flight.
- Have adaptations that minimize their weight such as hollow bones, reduced reproductive organ size in order to fly.
- Have a shelled egg similar to reptiles.
- Warm blooded with high metabolic rates.
- Efficient respiratory systems that allow the flow of oxygen at all times through their bodies even during exhalation.
- First appear in the fossil record about 150 mya.

Birds

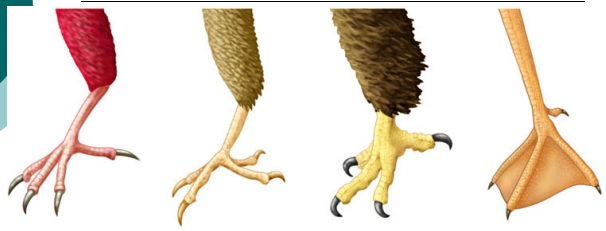
Some birds are gregarious, meaning that they come together in flocks. This behavior serves two purposes:

- Flocking individuals are safer from predators.
- Family groups that can efficiently scout for food.



Zedcor, Inc. From ClipArt.com

Adaptation - Specialization



Perching bird (such as a cardinal)

Grasping bird (such as a woodpecker)

Raptor (such as a bald eagle)

Swimming bird (such as a duck)

Figure 34.31

Mammals

- Have distinguishing hair or fur for insulation and warmth.
- Have mammary glands that supply milk for the suckling of their young.
- Give birth to live young with the exception of the platypus and echidna.
- Have well developed nervous systems and brains.
-Warm blooded with high metabolic rates.

Odd Mammal

The platypus is the exception to the rule.

- It has fur and feeds its young with milky secretions, but it lays eggs.
- This trait suggests a close link with the reptiles from which mammals are derived.

(a) Platypus

Marsupials

- Marsupials are mammals that have pouches in which they raise their young through early infancy.
- Examples of Marsupials include Koalas, Kangaroos, and Opossums, and Wallabies.

Photo from Yahoohoolicans website

Koala
Phascolarctos cinereus

Examples of Marsupials

(a) Wallaby (b) Wombat (c) Tasmanian devil

Eutherians (Placental Mammals)

- Compared to marsupials
  Eutherians have a longer period of pregnancy
- Young eutherians
  Complete their embryonic development within a uterus joined to the mother by the placenta

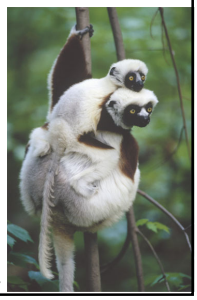


Figure 34.37

Diversification of Mammals

Mammals have evolved to fill nearly every niche (role) and habitat (place) on Earth.

Including:

> The sea → Cetaceans

> The air → Bats

> Highest Mountains → Pika & Marmots

> Hottest deserts → Swift fox

> Coldest regions → Polar bears & Seals

(a) Whale